



EMPOWERING INDUSTRY WITH
**ADVANCED RESEARCH
& DEVELOPMENT**



Powering Tomorrow with **Knowledge** and **Technology**

A first mover and forerunner for over five decades, Electrical Research and Development Association (ERDA) has been pioneering as India's premier Testing, Evaluation, Calibration, and Research Organization. ERDA has established its credentials as the hallmark in quality assurance. It has partnered with utilities, manufacturing industries and certification bodies for performance testing and evaluation of more than 150 electrical standards for national and international customers by virtue of its capability and competence.

ERDA is today one of the most preferred internationally acclaimed laboratories in the electrical sector. It continues to lead the way with technology, delivering leading-edge R&D services through its strong team of scientific researchers and technologists. ERDA is leaping forward towards a new vision, where tomorrow is powered by knowledge and technology.





A photograph of a laboratory interior. The foreground is filled with rows of yellow safety grates, likely for a test chamber. In the background, there is a blue door and a blue vertical structure. The ceiling has exposed pipes and lights.

India's Largest Online Short Circuit Laboratory - **120kA, 570 V**

Asia's Largest Ingress Protection (IP) Laboratory with **40 MT** Payload Capacity and Chamber Size **6.8 m x 5.8 m x 5.0 m**

900kV, 3 A High Voltage Partial Discharge Laboratory

2400kVp, 120kJ High Voltage Impulse Laboratory

EMIEMC Laboratory with **10 Meter** Semi Anechoic Chamber and **60V/m** Electric Strength

Communication protocol verification for Smart Meters using **CTT 4.2** standard & latest available tools from DLMS user association

Renewable Energy Portfolio including Solar PV Module, Solar Inverter and Solar Pump Laboratory

Laboratory for **Hazards Area** Equipment (Flameproof & Increased Safety)

Communication Protocol Verification Laboratory as per **IEC 61850**

1000 Hours Tracking & Erosion & **5000 Hours** Multi Stress Laboratory for Insulators



HOT-SPOT ENDURANCE TEST SETUP

Accreditation & Recognition

National Accreditation

- ▶ National Accreditation Board for Testing & Calibration Laboratories (NABL)
- ▶ Bureau of Indian Standards (BIS)
- ▶ Ministry of New and Renewable Energy (MNRE)
- ▶ Bureau of Energy Efficiency (BEE)
- ▶ National Accreditation Board for Certification Bodies (NABCB)
- ▶ Integrated Headquarters, Ministry of Defence (Navy) for EMI/EMC Testing
- ▶ Central Boiler Board (CBB), Government of India
- ▶ Petroleum and Explosive Safety Organisation (PESO), Nagpur
- ▶ Information Security Management System (ISO/IEC 27001:2013)
- ▶ Scientific and Industrial Research Organisation (SIRO) recognized by Government of India

State Accreditation

- ▶ Electrical Contractors Licence, Government of Gujarat
- ▶ Electricity Regulatory Commission of Gujarat and Madhya Pradesh (GERC and MPERC)
- ▶ Energy Development Agencies of Gujarat and Uttarakhand (GEDA and UREDA)

International Accreditation

- ▶ INTERTEK (ASTA), UK
- ▶ KAHRAMAA (Qatar)
- ▶ TNB (Malaysia)
- ▶ DEWA (Dubai)



High Voltage Impulse & Partial Discharge Laboratory

Testing & Evaluation

Power Equipment Testing

- ▶ On-line Short Circuit test facilities: 120kA, 570V - 1 no. & 50kA, 550V - 2 nos.
- ▶ Impulse Generator: 2400 kVp, 120 kJ - 1 no. & 1600 kVp, 80 kJ - 2 no. & 800 kVp, 40 kJ - 1 no.
- ▶ High Voltage Partial Discharge Test Facility: 900kV, 3A
- ▶ High Voltage Transformer: 700kVrms & 600kVrms
- ▶ IEC:61850 Communication Protocol testing facility
- ▶ Temperature-rise test facilities up to 20kA
- ▶ Time-current characteristics up to 40kA
- ▶ Electrical Endurance test up to 2.5kA at 690V
- ▶ Mechanical Endurance test for HT Circuit Breaker up to 145kV
- ▶ IP 5X & 6X test with capacity of chamber (6.8m x 5.8m x 5.0m) and weight 40 Tonnes
- ▶ Current Transformers up to 10 kA, 0.1 accuracy class
- ▶ Voltage Transformers up to 400 kV voltage class, 0.1 accuracy class
- ▶ Evaluation of LT / HT cables up to 400 kV

Products Tested

- ▶ Distribution Transformers
- ▶ Power Transformers
- ▶ Instrument Transformers
- ▶ Low and Medium Voltage Switchgears
- ▶ Low Voltage Switchboards
- ▶ Insulators and Bushings
- ▶ Cables and Accessories
- ▶ Capacitors
- ▶ Connectors
- ▶ Fuse Links and Fuse Bases





Testing & Evaluation

Secondary Equipment Testing

- ▶ 10 meter Semi Anechoic Chamber having shielding effectiveness from 10kHz to 40GHz & turn table capacity up to 3000kg
- ▶ Type C Goniophotometric Laboratory for Lighting testing with capacity of sample size of 1600mm & 50kg weight
- ▶ Complete Type Test Facility for Energy Meters and Smart Meters
- ▶ Energy Efficient Motor & Pump Testing up to 150 HP
- ▶ Type Test Facility for Solar PV Modules
- ▶ Solar Pump (up to 10 HP) and Solar Lighting System testing as per MNRE Guidelines
- ▶ Solar Inverter test facility up to 50kVA
- ▶ Evaluation Facility for Solar Battery
- ▶ Calibration services in the field of Electro-technical and Thermal equipments
- ▶ Testing of Flameproof Enclosures (PESO Approved)

Products Tested

- ▶ Solar PV Modules
- ▶ Solar Pump
- ▶ Solar Street Lighting
- ▶ LED Luminaires
- ▶ Energy Meters (including Smart Meters)
- ▶ Motor & Pump
- ▶ Household Appliances
- ▶ Professional Electronic Equipment





5000 Hours Multi Stress Testing on Insulators

Testing & Evaluation

Mechanical and Insulating Material Division

- ▶ Surface Condition and Stress Strain test on Conductor & Steel Core
- ▶ Thermal-mechanical Performance test
- ▶ Specified Mechanical Load test and Brittle Fracture test
- ▶ 1000 Hours Tracking & Erosion Test
- ▶ 5000 Hours Multi Stress Test
- ▶ Steep Wave Front Test (1000 kV μ s)
- ▶ Resonance Frequency and Dynamic Characteristics test
- ▶ Vibration, Seismic and Salt Spray test
- ▶ Specific Core Loss and Polarization test
- ▶ Degree of Polymerization (DP) and Rubber Identification & Filter Content test
- ▶ Dissolved Gas Analysis (DGA) & Furan analysis

Products Tested

- ▶ Overhead line Conductors, Hardware, Fittings & Structural Components
- ▶ HTLS Conductor & OPGW
- ▶ Insulators - Ceramic & Polymeric
- ▶ CRGO & CRNO steels
- ▶ Solid Dielectric Materials (Paper, Pressboards, Laminates, Adhesive tapes, Piercing Connectors/Dead End Clamps, Heat shrink sleeves etc.)
- ▶ Liquid Dielectric Materials (Mineral insulating Oil (New as well as In Use), Ester Oil)





Onsite Testing of Power Transformer up to 500 MVA, 400kV Class at Manufacture Site

Field Services

- ▶ Onsite Testing of Power Transformers upto 500 MVA, 400kV class at manufactures' works (Accredited by NABL)
- ▶ Third Party Inspection (TPI) Services (Material Inspection and Vendor Assessment) as per ISO/IEC 17020 - 2012 (Type "A" Accredited Inspection Body by NABCB for scope sector 16, 17, 18 & 19).
- ▶ Third Party Independent Agency for inspection of electrical networks (Installation Verification) for Rural Electrification Corporation Ltd (REC) and DISCOMs across India
- ▶ Working as Project Management Agency (PMA) under various Government Schemes such as DDUGJY and IPDS for various utilities
- ▶ Onsite Calibration of Equipment at Manufacturer Premises
- ▶ Onsite Witness Testing activity at Manufacturer Premises
- ▶ Third Party Inspection/verification of grid connected Solar PV systems
- ▶ Earthing health assessment & lightning protection study of electrical network
- ▶ Mobile Laboratory for Oil (in use), CT/PT and energy meter
- ▶ CT/PT/CVT and Energy Meter Calibration at site by both primary and secondary current injection method
- ▶ EMI EMC testing (except radiated immunity test) as per IEC: 61000-6-2 & IEC: 61000-6-4
- ▶ Detection of micro crack in Solar PV Module using EL camera.
- ▶ Solar inverter efficiency measurement at site as per IS/IEC: 61683
- ▶ Solar PV Modules and Arrays
 - Advance PV analyzer (I-V Curve tracer) for Commissioning, Auditing and Troubleshooting of PV systems
 - IR camera for thermal performance monitoring of PV systems
 - Monitoring and analysis of complete solar PV systems
 - Due diligence of Solar Power Plant

Capabilities

- ▶ Onsite Testing of Transformers (tested more than 8000 Distribution Transformers and 500 Power Transformer at the manufacturer premises)
- ▶ Onsite Combined CT/PT and Energy Meter testing by Primary or Secondary Injection Method
- ▶ Working as Third Party Inspection Agency (TPIA) & Project Management Agency (PMA) under Government Schemes like DDUGJY, IPDS for various Utilities
- ▶ 320 Sites Executed for Onsite Due Diligence of Solar Plants





Broadband Dielectric Spectroscopy of Materials

Research and Development

The Focus of the Research and Development vertical is to undertake sponsored and in-house Research Projects in five Technology Missions.

- ▶ Advanced Materials (with the Expert Services for Failure Analysis)
- ▶ Renewable Energy
- ▶ Diagnostics (Electrical & Mechanical)
- ▶ Power System & Smart Grid (with the Expert Services for Power Quality Measurements)
- ▶ New Product Technologies

Technologies Developed

- ▶ Corrosion Resistant Paint using Nano-Carbon Technology
- ▶ Anti Dust Coating on Solar PV Panels
- ▶ Silver Based Contact Materials using Nano-Technology for LV Switchgear
- ▶ On Line Fault Sensor for Transformers
- ▶ Automatic Solar PV Cleaning System
- ▶ IoT based Hot spot detector for Transformers
- ▶ IoT based Wireless Thermal Sensor for Electrical Panel Busbars
- ▶ IE-4 Induction Motors
- ▶ Charge Controller for Electrical Vehicle





Electrical Diagnostic

Expert Services

Power System Studies

- ▶ Load Flow, Short Circuit & Transient Stability
- ▶ Evaluation of Parallel Operation Charges
- ▶ Power Quality Measurement & Mitigation for Utilities. IPPS & CPPS
- ▶ Transmission Planning and Power Evacuation
- ▶ Dynamic Stability
- ▶ Relay Coordination
- ▶ Protection Audit

Renewable & Smart Grid

- ▶ Renewable Energy Integration
- ▶ Microgrid & its Integration
- ▶ Power Quality Measurement & Mitigation for Wind & Solar Plants

Root Cause Analysis

- ▶ Root Cause Analysis of Failed Boiler Tubes and other Mechanical Components
- ▶ Failure and Root Cause Analysis of Electrical Equipment e.g. Cable, Insulator, CT/PT etc.

Engineering Analysis Services

- ▶ Product Optimization
- ▶ Product Development
- ▶ Electromagnetic, Electrostatic, Multiphysics, CFD, Structural Simulation

Electrical Diagnostic

Online & Offline testing on

- ▶ Transformer ▶ Generator
- ▶ Motor ▶ Cable & Switchyard Equipment

Mechanical Diagnostic

Residual Life Assessment (RLA) and Non Destructive Testing (NDT) services on

- ▶ Boilers ▶ Vessels
- ▶ Turbines ▶ Storage Tanks
- ▶ Reactors

Energy Management Services

- ▶ Mandatory Energy Audit & M&V Audit
- ▶ GHG Audit
- ▶ Water & Emission Audit
- ▶ PMC for Greenfield Projects
- ▶ Electrical & Process Safety Audits

Facilities

- ▶ Engineering Analysis Centre equipped with Simulation and Modelling Packages e.g. Solid Works, Ansys, CFX, Fluent, Maxwell, RMxprt, CFTurbo/ Pumplinx
- ▶ Power System Study and Power Quality Lab equipped with Softwares e.g. ETAR EMTP-RV, Mi-Power etc.
- ▶ Material Research Lab
- ▶ Material Characterization Lab using Optical Microscopy SEM, XRD, FTIR etc.
- ▶ Power Electronics Lab



International Customers



EXPERIENCE THE EXCELLENCE

ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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